REMARKS

A petition for a one month extension of time has today been filed as a separate paper and a copy is attached hereto.

The examiner will note that claims 81-85 and 87, and the previously withdrawn claims, have been cancelled by this amendment. Accordingly, the only issue remaining of record is patentability of claims 75-85, 87, 89, 99 and 106 over Japanese 61-163154.

The rejection of claims 75-85, 87, 89, 99 and 106 for obviousness over Japanese 61-163154 is respectfully traversed. The examiner's attention is directed to the first full paragraph at page 3 of the partial translation of the reference which reads as follows:

> The adhesives to be used for the adhesion of fine powder particles preferably include those having a water-resisting nature and an excellent wetability to the adopted fibers, such as an acrylic emulsion and epoxy emulsion.

In prior discussion with the examiner, the undersigned argued that such emulsions are water-based and, accordingly, the coated fibers produced by the reference cannot possibly have unhardened dry hydraulic inorganic powder adhered thereto because the adhesive used by the reference is aqueous in nature. In contradistinction all of the rejected claims define the reinforced forcing fiber as "having unhardened dry hydraulic inorganic powder adhered thereto" through the medium of "an organic binder" and the reinforcing material is further defined as

hardening "upon contact with water."

In conversation with the examiner, the examiner appeared reluctant to accept, on its face, the argument that the "acrylic emulsion" and "epoxy emulsion" of the reference are water-based. Now, in support of applicants' position that such emulsions are indeed water-based, submitted herewith are four documents obtained by an internet search. Document #1 is a "Cognitive" supplies glossary - "A" which defines "acrylic emulsion" as "A water-based latex made with acrylic polymers, used in coatings and adhesives." Document #2 is "an overview of emulsion polymers used in the adhesives industry" by Paul Ita. Mr. Ita's article, at page 1, teaches that emulsion polymers are gaining in popularity as adhesives because they are water-based. The adhesive emulsions which are discussed include acrylic emulsions (page 2). Document #3 from the Rotafix web pages describes a "2 pack water based epoxy emulsion." Perhaps of more relevance with regard to the nature of epoxy emulsions is Document #4 "Technical Bulletin #108" from the C-Cure web site. Document #4 is of interest for its teaching that all epoxy emulsion mortars and mastics contain water and, therefore, should not be used as adhesives in installation of certain moisture sensitive tiles. The four documents submitted here are merely representative of the prior art evidencing the fact that acrylic emulsions and epoxy emulsions are understood in the art to be water based. Accordingly, their use in the reference to bind an inorganic hydraulic material to a fiber would necessarily wet that material and cause it to undergo a hardening reaction with the result that the coated fiber would be quite different from that as defined by the rejected claims.

In conclusion, it is respectfully requested that the examiner reconsider the remaining rejection of record with a view toward allowance of all remaining pending claims.

Respectfully submitted,

George A. Loud
Reg. No. 25,814

Dated: December 10, 2003

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#1

A

ABRASION RESISTANCE:

This is a measure of the degree that a surface is able to resist degradation from rubbing upon it.

ACCELERATED AGING:

Test procedures subjecting materials to environmental conditions in order to predict aging.

ACETATE:

A plastic synthesized from cellulose dissolved in acetic acid which exhibits rigidity, dimensional stability, and ink receptivity. Transparent or matte finish available.

ACRYLIC ADHESIVE:

Adhesive based on high-strength, acrylic polymers. Can be either a solvent or emulsion system.

ACRYLIC EMULSION:

A water-based latex made with acrylic polymers, used in coatings and adhesives.

ACRYLIC:

A family of thermoplastic resins based on acrylic acid and its derivatives. A basis for many adhesives used with pressure sensitive labels.

ADHESION:

A measurement of the force required to remove a label from a surface.

ADHESIVE BLEED:

See ooze.

Article

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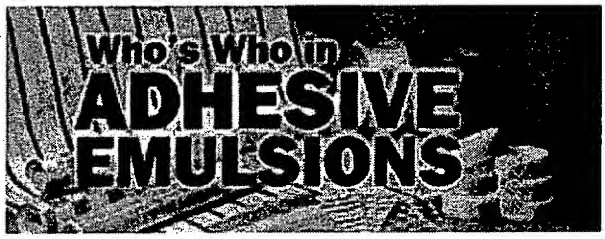
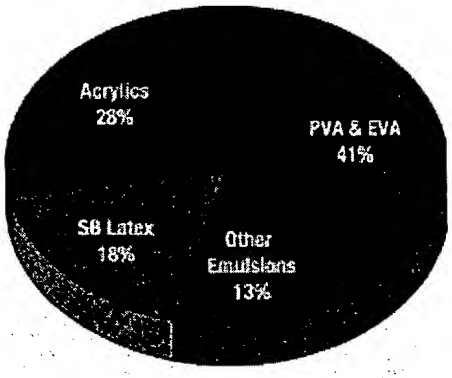
An Overview of Emulsion Polymers Used in the Adhesives Industry

Paul Ita, Senior Research Analyst, The Freedonia Group Inc., Cleveland



In 2000, demand for emulsion polymers in the global adhesives industry totaled 1.9 million metric tons (dry basis), valued at $3.4 billion. (These totals exclude materials used as carpet adhesives and backings, primarily styrene-butadiene latex.) Demand for adhesive emulsions is forecast to expand 4.4 percent per year to 2.3 million metric tons in 2005, slightly outpacing inflation-adjusted growth in the global economy, which is forecast at 3.7 percent annually between 2000 and 2005.

Emulsion polymers are widely used as the polymeric base for a variety of general-purpose adhesives. The largest volume market for these materials is packaging adhesives used for paper and paperboard packaging, including boxes, folded cartons and paper bags. Emulsions also serve as binders for pressure sensitive adhesives used for tapes and labels; in the production of nonwovens such as diapers and feminine hygiene products; and in consumer products such as household glue and carpenter's wood glue.



World Demand for Emulsion Polymers in General-Purpose Adhesives, 2000
(1.9 million metric tons)

Adhesives based on emulsion polymers are gaining in popularity for a number of reasons. The most prominent of these is the fact that switching to water-based adhesives from solvent-based adhesives allows manufacturers to significantly reduce their emissions of volatile organic compounds, a key factor in the more mature adhesives markets of the United States and Europe. Other benefits to emulsion adhesives include the absence of flammable solvents, which makes handling and mixing easier, reducing the risk of fire and minimizing the special precautions required for the use of solvent-based adhesives in the areas of ventilation, flameproof lighting and segregation from other factory operations.

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As is the case in other segments of the emulsion-polymer market, particularly in paints and coatings, demand for emulsion polymers in adhesives markets is benefiting from social and regulatory pressures promoting the use of more environmentally compliant materials. Adhesives suppliers are responding to these trends by introducing formulations with lower solvent and higher overall solids contents, including a shift to emulsion-based adhesives where feasible and cost-effective. In addition to emulsion adhesives, these trends also are promoting demand for competitive, environmentally friendly systems, particularly hot melts and radiation curables.

TOP

Adhesive Emulsions by Type

PVA and EVA predominate, but acrylics are steadily expanding their market share.

General-purpose adhesives may be based on any one of a range of emulsions, including vinyl acetate polymers (encompassing polyvinyl acetate [PVA] and ethylene vinyl acetate [EVA]), acrylics and styrene-butadiene (SB) latex. Smaller volume types include emulsions based on polyvinyl chloride, latex nitrile and acrylonitrile copolymers. PVAs are among the least expensive materials available, while acrylics generally are the most costly, with SB latex typically falling in between.

Vinyl acetate polymers will remain the largest segment of the market, where polyvinyl acetate, ethylene vinyl acetate and other polymers serve as moderately priced, nontoxic glues. Most prominently, PVA is used as the base for both white glue and carpenter's wood glue, two versatile, general-purpose products with broad use in the consumer segment. Vinyl acetate polymer adhesives are amenable to high-speed production processes and function best in the bonding of paper and wood. In particular, PVA and EVA adhesives are widely used in paperboard packaging, particularly the side seaming of lightweight board used for small cartons or boxes. These adhesives also find use in bookbinding, on-site construction, textiles, envelopes, bags and sacks, and labels. Furniture uses include wood veneer, edge gluing and general assembly. Global demand for vinyl acetate polymer emulsions in adhesives is forecast to approach one million metric tons by 2005.

Acrylics (encompassing pure acrylics as well as styrene acrylics and vinyl acrylics) are gaining market share in adhesives, particularly in pressure sensitive tapes and labels, such as envelopes, decal and label applications, as well as medical tapes. In these applications, acrylics function well in both removable and permanent pressure sensitive adhesives. In permanent pressure sensitive applications, acrylics offer good mechanical stability and provide the necessary high tack and peel strength. For removable applications, acrylics offer good mechanical stability and good cohesive strength. Acrylic emulsions can also be used to join a variety of substrates including metals, plastics, ceramics, wood, leather and textiles. Global demand for acrylic emulsions in adhesives markets is forecast to exceed 600,000 metric tons by 2005.

SB latex is used as the polymeric base for pressure sensitive adhesives, where SB latex tackifiers compete primarily with higher performance acrylics and specialized butyl rubber compounds. In adhesives, SB emulsions provide good resistance to water and solvents, good low-temperature properties, high tensile strength and good adhesion to a variety of substrates. Global demand for SB latex used in adhesives is forecast to exceed 400,000 metric tons by 2005.

TOP

Adhesive Emulsions by Market

Paper and paperboard packaging markets stable, slower growing; strongest gains forecast for tapes and labels.

Emulsion-based adhesives are used primarily in packaging applications, particularly paperboard products such as boxes (corrugated, solid, folding and set-up), sanitary food containers, tubes,

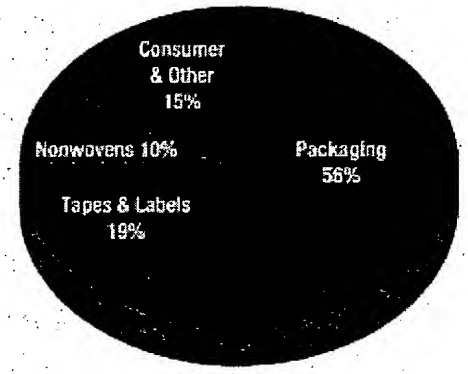
cans and drums. Paper packaging includes shipping sacks, along with paper bags and sacks, envelopes and associated materials. Other packaging markets include laminations such as paper/foil, foil/film and film/film. The most rapid annual gains in this segment are forecast for pressure sensitive adhesives used in the production of tapes and labels, where demand for emulsion polymers is forecast to exceed 400,000 metric tons in 2006. One major factor behind gains in demand for tapes and labels will be the improved cost and performance characteristics of pressure sensitive tapes, which are allowing these materials to replace and/or supplement cold-set glues and, in certain circumstances, mechanical fasteners in the manufacture and assembly of durable goods. Intense functional competition for emulsions will continue to arise from various elastomer-based hot melt adhesives, particularly hot melts based on thermoplastic elastomers (TPEs) (such as Kraton styrenic block copolymers), which have carved out a strong position in tapes and labels over the last decade in United States and West European markets. The nonwovens market encompasses emulsions used in the production of various disposables, which includes diapers, feminine-hygiene products and adult-incontinence products, along with medical products. Major applications include binding together the absorbent fibers, as well as bonding the absorbent portion to the outer layer. In these uses, emulsion polymers act as binders and provide solvent resistance, wet and dry strength, and a soft-hand feel in disposable products such as towels, wipes, diaper-cover stock, feminine-hygiene products and surgical packs.

TOP

Adhesives Emulsion Suppliers

At the end of 2000, the global market for emulsion polymers (encompassing all markets, not just adhesives) totaled $14.9 billion. The three leading suppliers are Rohm and Haas, Dow Chemical and BASF, which support annual sales of emulsion polymers in 2000 ranging from just under $1 billion for BASF to well over $1 billion for Dow and Rohm and Haas.

There is also a formidable second tier of suppliers with annual sales of emulsion polymers in the $300-million to $600-million range in 2000. This group encompasses Air Products Polymers, Clariant, Reichhold, Eni, National Starch and Chemical, OMNOVA Solutions, PolymerLatex and Rhodia.



World Markets for Adhesive Emulsions, 2000
(1.9 million metric tons)

In January 2002, Dow Chemical and Reichhold launched a new 50/50 joint venture called Dow Reichhold Specialty Latex, which combined Dow's Specialty Latex business with Reichhold's Emulsions business. Considering that both Dow and Reichhold are major adhesives suppliers in their own rights, the new venture has a major presence as a supplier of emulsions to the adhesives industry, particularly in construction-related applications such as mortars, repair compounds and tile adhesives, as well as packaging adhesives, masking tape and wood adhesives. The venture is the world's leading producer of SB latex and holds significant positions in acrylics and vinyl acetate polymers.

Rohm and Haas also is a leading, vertically integrated player in the adhesives segment, producing acrylic acid feedstocks as well as acrylic emulsions and a wide range of acrylic packaging and pressure sensitive adhesives. Rohm and Haas is the world's largest supplier of emulsions, and its adhesives business ranks as the fifth largest in the world.

Among other emulsion suppliers, National Starch is among the world's leading suppliers of adhesive emulsions, particularly as a captive supplier for its own adhesives business, where National Starch ranks second in the world behind Henkel/Loctite. In addition to its captive business, National Starch is a major merchant supplier of emulsions through its Vinamul Polymers unit, which has merchant sales of about $300 million concentrated in vinyl acetate polymers (about 80% of merchant sales), as well as acrylics.

Other leading emulsion polymer suppliers that support a significant focus on adhesives applications include Air Products Polymers (a joint venture between Air Products and Wacker), BASF, Clariant and Eni. Air Products Polymers focuses on vinyl acetate polymers, which are offered under the Airflex tradename for adhesives and other applications. Wacker and Air Products also participate in another joint venture, Wacker Polymer Systems, which manufactures redispersible powders. Clariant also produces primarily vinyl acetate polymers, which are marketed under the MOWILITH tradename for adhesives and other markets.

BASF produces SB latex as well as acrylic and styrene-acrylic dispersions under the Acronal tradename for pressure sensitive and industrial adhesives, among other applications. Eni produces SB latex through Polimeri Europa. Other major suppliers of emulsion polymers include Avecia (NeoResins), JSR and Noveon.

TOP

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The Freedonia Group, Inc.

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ROTAFIX

AQUACHEM WB (INJECTION) ADHESIVE

PRODUCT CODE: 3532 400cc

DESCRIPTION: **AQUACHEM WB (INJECTION) ADHESIVE** is a 2 pack water based epoxy emulsion system which can be used for the fixing of ceramic and stone tiles or paviours to concrete or cementitious renders. It is suitable for swimming pool applications.

PACKAGING: **AQUACHEM WB (INJECTION) ADHESIVE** is supplied in two screw cap containers, one contains the base resin the other contains the curing agent. Included is a follower plate and empty cartridge assembly. Can be supplied in 10 litre industrial size packs (special order and mixing instructions).

Mixing knife Ref:3642. 400cc Skeleton Gun Ref:3667. Available from Rotafix.

MIXING: Add the total contents of the smaller container 'Base' to the contents of the larger container 'Hardener'. Mix thoroughly, ideally using mixing knife reference:3642. Place the follower-plate onto the surface of the mixed material ensuring it fits parallel in the tub with the outer and central lip pointing upwards. Cut the seal from the front end of the cartridge sleeve. Place the back end of the cartridge vertically and centrally over th hole in the follower-plate. Press the cartridge firmly and continuously down on the follower-plate until the follower-plate bottoms on the mixing tub base. Carefully remove and invert the now full cartridge. Screw on the font injection nozzle and insert the rear plunger.

PREPARATION & APPLICATION All surfaces should be clean and free from laitance or other deleterious substances. The adhesive can be applied to stone, brick, concrete, asphalt, ferrous surfaces and some non ferrous substrates. The normal thickness should not exceed 5mm. Do not mix, apply or use at temperature below +5°C or when the temperature is likely to fall below +5°C during the cure schedule.

COVERAGE: e.g. joints 5mm x 10mm require 50cc/linear meter
i.e. 1 litre produces 20 linear meters of 5mm x 10mm joint

CURE SCHEDULE: Cure times are dependent upon temperature and relative humidity. Initial cure 4 - 12 hours at +20°C and relative humidity of 40% or less. Full cure 7 days at 15 - 18°C.

CURED PROPERTIES:

Compressive Strength:	25N/mm^2	S.G. approximately: 1.35
Flexural Strength:	13N/mm^2)	
Tensile Strength:	17N/mm^2)	provisional
Standard Colour:	Off White	

Chemical Resistance - unaffected by a wide range of industrial and domestic chemicals. For specific applicatiion, please consult out Technical Department.

CLEANING OF TOOLS: Uncured **ROTAFIX AQUACHEM WB INJECTION ADHESIVE** may be readily removed with warm water and soap. Mechanical methods are required to remove cured material.

Epoxy resins and their associated curing agents can cause irritation to some people. Please take the necessary precautions indicated in the COSHH details available from our offices.
Please read our Users Safety Guide on the Handling of Resin and Polymer products.

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#4

Technical Bulletins

Technical Bull tin #108

Installing Marble Tiles (How to avoid warpage, staining, shading, soft spots, blisters and bond failures).

Unsatisfactory marble tile installations can be avoided with some simple considerations when certain types of tiles are chosen. Selecting the right bonding material by consulting with the tile manufacturer, tile distributor or adhesive manufacturer can be simple. The following guidelines will help eliminate many costly errors and installation problems.

Natural Marbles
When marble tiles are produced, they are cut to the narrowest thickness that can be handled, polished, packaged, shipped and installed without breakage. Cutting the marble in this manner produces the most tiles from a block of marble, which makes it more available and lowers the costs. These thin cut marble tiles reply on proper bonding materials to produce a satisfactory installation.

Bonding Green, Red, and Black Colored Natural Marble Tile
These marble tiles contain certain minerals (example: all green marble contains serpentine) that soften, blister, swell or curl when they come in contact with water or moisture. All green marbles, some black and certain red marbles are water sensitive and experience problems. It is always best to ask the marble tile manufacturer if the tile is water and moisture sensitive. These moisture sensitive tiles should be bonded with a 100% solids epoxy mortar like C-Cure's ColorSet Epoxy 931 or EverWhite Epoxy 932. All other dry-set mortars, epoxy emulsion mortars and mastics contain water and should not be used.

Bonding Light Colored or Translucent Marble Tile
Exterior and interior lighting can pass through these types of tile. Once the floor has been installed, these light-colored or translucent marble tiles will show shadows or ghosting from dark or dissimilar colored bonding materials. This problem can be eliminated by using a "white" adhesive or dry-set mortar and making sure that all tiles installed achieve full (100%) contact with the setting materials. The easiest way to achieve full contact with the tile is to "Back Butter" the tile in addition to troweling bonding material on the substrate.

Bonding Fiber Reinforced Resin Backed Marble Tile
These tiles are cut exceptionally thin but are reinforced with fiber mesh and resin coating at 1/32" - 1/16" in thickness. These resin back coated tiles have a very inert and nonporous bond surface that requires the extra bond strength of C-Cure's ColorSet Epoxy 931 or EverWhite Epoxy 932.

Avoiding Discolored Marble Tile and Tile Edges
Many times a marble installation may appear perfect but is not. Cutting of the marble at the jobsite is required as an installation becomes more intricate or involves a decorative design pattern. The cutting saw used to make the custom cuts in the tiles requires a liquid to cool the cutting blade. Most of the time this liquid is common water. When a cutting saw is used, the cooling liquid or water will accumulate fine particles or grindings. As the marble tiles are being

cut by the saw and sprayed with the contaminated water, staining of certain tile pieces or tile edges will occur. This can be avoided by cleaning debris from the saw and changing to clean water when different colored tiles are to be cut on the saw.

- Moisture Staining

Marble tiles that are not water sensitive may show some darkening due to absorption of moisture/water from the setting materials or maintenance. This moisture darkening is caused by the tiny capillaries or pores within the marble holding water. The moisture staining remains temporarily until evaporation of the water occurs.

Care and Maintenance

Nature marble tiles are porous and will absorb liquids. To avoid surface stains cleaning the marble with neutral cleaning solution or cleaner approved "for use on natural marble" by the manufacturer is required. The same criteria will hold true for any sealers, polishes or waxes used on the installation. Use the same care and cleaning with the grout as used in the marble installation. Obtaining polishes, sealers and cleaners approved in writing as "safe" or "recommended" for natural marble will prevent problems.

Technical Bulletin #108-TB-0101

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